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CHANGING CONSUMPTION AND PRODUCTION PATTERNS

Report of the Secretary-General

Addendum

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INTRODUCTION

1. The report of the Secretary-General (E/CN.17/1996/5) contains a brief overview of key issues in each element of the programme of work on changing production and consumption patterns, adopted by the Commission on Sustainable Development at its third session. The present addendum provides supporting information and more in-depth analysis of those key issues.

I. IDENTIFYING THE POLICY IMPLICATIONS OF TRENDS AND PROJECTIONS IN CONSUMPTION AND PRODUCTION PATTERNS

2. The present section reviews the latest data on trends and projections relating to key inputs and outputs of production and consumption processes. Inputs and outputs have been selected on the basis of their importance in the global economy and/or the impacts on environmental quality or human health caused by current levels of exploitation. It is expected that an expanded set of inputs and outputs will form the future basis of ongoing monitoring and reporting to the Commission on Sustainable Development. In addition, future monitoring of trends and projections in resource use/pollution will be extended to include greater analysis of key economic and social driving forces that are the determinants of consumption and production patterns.

A. Profile of selected consumption and production trends

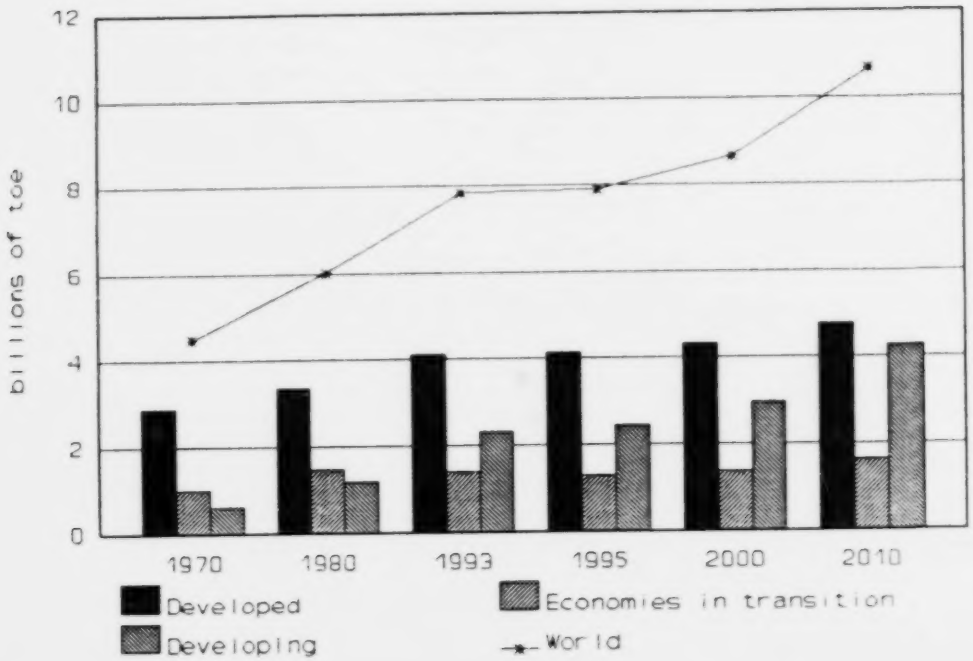
1. Energy use and emissions

3. World energy demand has continued to grow. Between 1970 and 1993, demand grew at an average annual rate of 2.5 per cent. Developing countries consumed 604 million tonnes of oil equivalent (toe) in 1970: by 1993, consumption had risen to 2,317 million toe. In developed market economies, demand increased from 2,888 million toe in 1970 to 4,125 million toe in 1993. In terms of the share of world demand, developing countries accounted for 30 per cent in 1993, up from 14 per cent in 1970 (see figure 1).

4. Growing energy demand has resulted in more emissions. CO_2 emissions from fossil fuel combustion in countries members of the Organisation for Economic Cooperation and Development (OECD) rose from 1.47 billion tonnes of carbon in 1960 to 2.84 billion tonnes in 1992. CO_2 emissions in the economies in transition increased from 0.56 billion tonnes of carbon in 1960 to 1.18 billion tonnes in 1992. As a group, developing countries emitted 0.38 billion tonnes of carbon in 1960 and 1.83 billion tonnes in 1992. This continuing rise in anthropogenic emissions of CO_2 and other greenhouse gases poses potentially substantial risks to global physical and ecological systems, human health and socio-economic sectors.

5. On the positive side, the world during this period witnessed a 19 per cent decline in energy intensity. The OECD countries achieved a steeper decline (29 per cent) by shifting out of energy-intensive industries and by enhancing the energy efficiency of industrial processes. OECD region SO_x emissions also fell, from 65 million tonnes in 1970 to 40 million tonnes in 1990 - a decline of 38 per cent. Total NO_x emissions first increased from 33 million tonnes in 1970 to 41 million tonnes in 1980, then fell to 37 million tonnes in 1990. The notable exception to this pattern is NO_x emissions from transport, which increased in many countries.

Figure 1. Consumption of commercial energy



6. However, progress in energy efficiency has been largely offset by volume increases in economic activity, well illustrated by the case of road transport. In the United States of America, for example, automobile fuel efficiency improved by some 60 per cent over 20 years but total automobile fuel consumption remained largely unchanged owing to increases in vehicle travel. The key challenge in future energy use will be to increase the rate of delinking between energy consumption and economic growth and to move towards decarbonizing the world's energy supply.

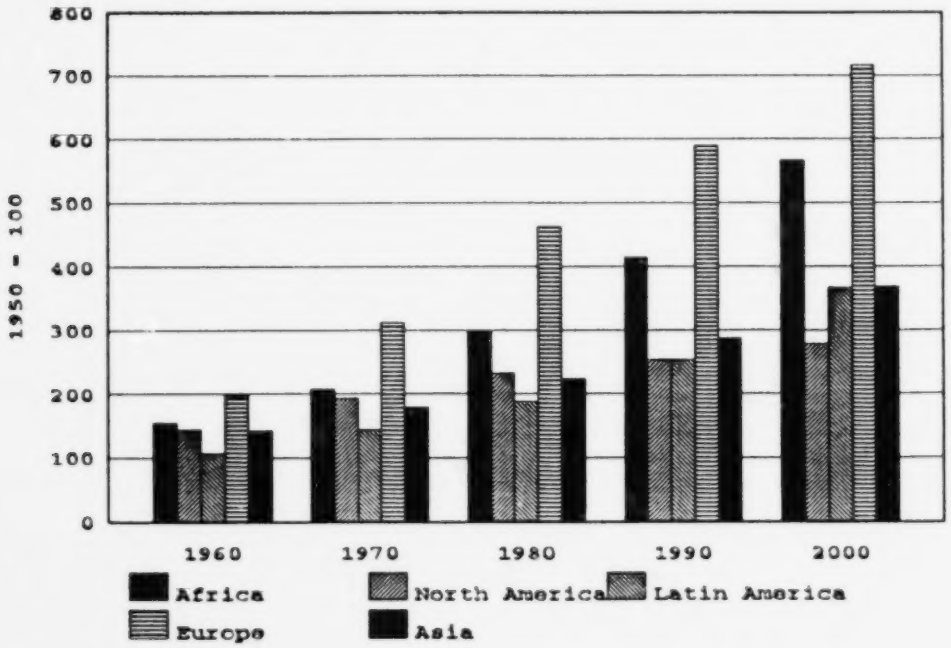
2. Freshwater consumption

7. At present, 28 countries in Asia and Africa with a total population of 338 million are considered water stressed, unable fully to meet their basic water requirements. One billion people in developing countries still lack access to an adequate supply of water and 1.7 billion people do not have adequate sanitation facilities. In urban areas, the number of people without adequate access to sanitation facilities increased by some 70 million during the 1980s.

8. World wide, total water use has increased steadily since 1950, when annual withdrawals were about 1,360 km^3. Consumption nearly doubled by 1960 and by 1990 annual withdrawals reached 4,138 km^3 (see figure 2). On a regional basis, Asia was the largest consumer (2,478 km^3), followed by North America and Europe (796 and 673 km^3, respectively). Africa and Latin America accounted for a smaller proportion, at 317 and 216 km^3, respectively. In terms of water use by sectors, some 70 to 90 per cent of water withdrawal in developing countries is for agriculture, as against 39 per cent in developed countries. But water

use by industry is higher in developed countries (47 per cent) than in developing countries (a mere 5 per cent). Affluence also entails more water consumption for domestic purposes, which in high-income countries accounts for 14 per cent of total water withdrawal, as against 4 per cent in low-income countries.

Figure 2. Increasing rate of water use by continent (index)



9. Improvements in the efficiency of water use, especially in the agriculture sector, lag behind the gains made in energy. Average water losses in irrigation amount to 55 per cent; improved irrigation techniques and management could achieve dramatic savings in many countries. Conservation measures in industry and households will also be necessary for more sustainable water consumption. These measures are of particular relevance in developing countries, where rapid urbanization poses a special challenge to increasing the supply of safe drinking water and providing adequate sanitation infrastructure.

3. Consumption of food and forest products

10. World agricultural production increased at an average annual rate of 2.4 per cent between 1961 and 1994. This exceeded world population growth by a small margin, allowing a corresponding increase in per capita food supply. During this period, the rate of increase in per capita food supply was much greater in developing countries - 32 per cent, compared with just 10 per cent in the industrialized world. However, per capita calorific intake in developing countries remains at about 75 per cent of the Western diet.

11. The world total fish catch increased from 37 million tonnes in 1961 to 93 million tonnes in 1991. Per capita fish consumption in developed countries

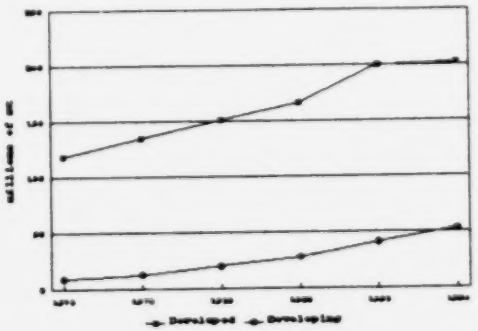
increased by 18 per cent and that in developing countries by 45 per cent. But per capita fish consumption in developing countries was approximately one third of the level in developed countries.

12. An emerging concern in agriculture is that despite the increasing use of fertilizers, growth in world grain yield per hectare is falling. While grainland productivity rose by more than 2 per cent a year between 1950 and 1984, the annual increase was only 1 per cent between 1985 and 1993, well below population growth. Further declines in yield growth, if sustained, would have serious implications for world food security, especially in low-income, food-deficit countries (see sect. I.B below).

13. Global consumption of roundwood increased from 1,900 million m³ in 1961 to 3,429 million m³ in 1991. In per capita terms, roundwood use in developing countries was only 37 per cent of the roundwood use in developed countries in 1991. However, the share of developing countries rose from 42 per cent in 1970 to 58 per cent in 1991. Moreover, fuelwood and charcoal was the dominant form of wood use in developing countries - accounting for 80 per cent of the total as against 16 per cent in developed countries. This pattern is determined by income and it remained largely unchanged over those years.

14. Paper and paperboard production has continued to rise steadily, with accelerating rates of consumption in OECD countries (see figure 3). In 1993, use of paper and paperboard in developing countries was only 32 per cent of the level in developed countries. This situation may be expected to change with increasing literacy rates and use of computers in the developing world: personal computers are currently estimated to consume 115 billion sheets of paper annually.

Figure 3. Production of paper and paperboard



4. Consumption of metals and minerals

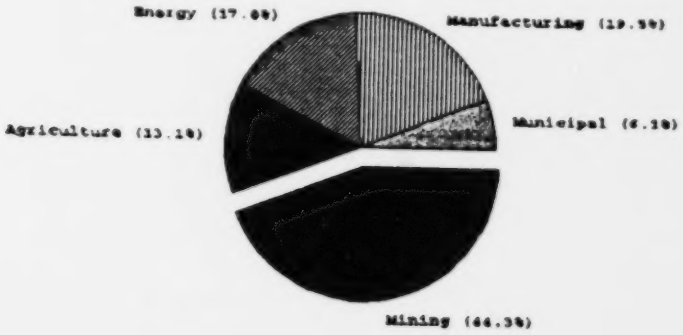
15. World demand for metals and minerals rose by 120 per cent between 1961 and 1990. The growth rates were highest among low-income developing countries, averaging 7 per cent a year in the 1970s and 5 per cent in the 1980s. Demand in OECD countries has slowed considerably since 1970 as a result of structural changes in their economies and technological progress (materials efficiency). Their share of global consumption fell from 59 per cent in 1961 to 44 per cent in 1990. On a per capita basis, consumption of metals and minerals in low-income developing economies remains small compared with OECD countries. For

example, although per capita demand for copper in developing countries grew by 84 per cent between 1970 and 1990, compared with 8 per cent in developed countries, their per capita use of copper in 1990 was only 6 per cent of the use in developed countries.

5. Waste generation

16. Unlike consumption of energy and some materials, waste generation has shown no sign of delinking from economic growth. Waste volumes in OECD countries totalled approximately 6.7 billion tonnes in 1990, of which mining wastes accounted for 44 per cent (see figure 4). The waste-product ratio in mining is extremely high: gold mining generates about 9 tonnes of spoil for every ounce of metal. Municipal waste volumes rose by 36 per cent between 1975 and 1990 in OECD countries. The trend is driven by both economic growth and changing lifestyles - for example, the shift to highly packaged convenience foods. Quantities of municipal solid waste in the United States are expected to increase from 182 million tonnes in 1990 to 213 or 251 million tonnes in 2010, depending on income growth prospects. This trend is likely to be replicated in many other countries.

Figure 4. Waste generation by sector, OECD countries, 1990



B. Forecasts for resource consumption

17. On a business-as-usual basis, world demand for commercial energy is estimated to reach 10.7 billion toe in 2010, up from 7.9 billion toe in 1995. Demand by developed countries is expected to grow at an annual rate of 0.9 per cent, reaching 4.8 billion toe in 2010. Demand by developing countries is expected to rise at an annual rate of 3.7 per cent, totalling 4.3 billion toe in 2010, but still below that of developed countries.

18. In 2050, world energy demand may rise to 20 billion toe, according to a middle-course scenario developed jointly by the International Institute of Applied Systems Analysis (IIASA) and the World Energy Council (WEC). The scenario, which is considered more probable than other technology- or policy-intensive ones, postulates a world population of 10.1 billion, a gross world product of $75 trillion and a medium level of technology dynamics. The scenario also assumes that, given the time-frame of capital turnover in the energy system, energy supply and end-use patterns until 2020 will be largely unchanged but that a transition away from fossil fuel is feasible and manageable.

19. Some 90 per cent of CO_2 emissions will come from commercial energy use. Under a low emission scenario, OECD countries will emit 2.53 billion tonnes of carbon in 2010, less than the peak level of 2.84 billion tonnes of carbon in 1992. Developing countries will increase their emissions from 1.83 billion tonnes of carbon in 1992 to 3.2 billion tonnes of carbon in 2010, whereas emissions in the economies in transition will register a smaller increase - from 1.18 billion tonnes of carbon in 1992 to 1.38 billion tonnes of carbon in 2010. Total world emissions of CO_2 are estimated to rise to 7.11 billion tonnes of carbon, compared with 5.85 billion tonnes of carbon in 1992. Under the middle-course scenario developed by IIASA and WEC, world CO_2 emissions will rise to 10 billion tonnes of carbon in 2050. If no action is taken to stabilize greenhouse gas concentrations, global mean surface temperature is projected to increase by 1-3.5° C by 2100, and an associated rise in sealevel of about 15-95 cm, with potentially serious impacts on ecosystems and human development.

20. Total water abstractions are expected to exceed 5,000 km^3 per year in 2000. Annual per capita water availability in Asia and Africa is likely to experience drastic falls, with per capita availability as low as 3,300 m^3 in Asia (compared with 9,600 m^3 in 1950) and 5,100 m^3 in Africa (compared with 20,600 m^3 in 1950). Over 30 countries in the two regions are projected to become water scarce by 2025.

21. World agricultural production is forecast to continue to grow at an annual rate of 1.8 per cent until 2010. On a per capita basis, the growth rate will be reduced to 0.3 per cent. Per capita food supply in developed countries will remain largely unchanged. Progress in increasing the food supply in developing countries will continue but, at 2,730 cal/day in 2010, developing countries will still consume less than developed countries (3,470 cal/day).

22. World roundwood consumption is forecast to reach 5,069 million m^3 in 2010. Developed countries will consume 2,153 million m^3 - about 42 per cent of the total, with the rest used in developing countries. As such, the percentage share of roundwood consumption will remain basically unchanged from the 1990 figure. The main noteworthy development is a 7 per cent increase in consumption of industrial roundwood by developing countries, accompanied by a corresponding decline in fuelwood consumption.

23. Consumption trends of metals and minerals are likely to follow the projected patterns of other commodities and products. Developed countries are expected to see small increases in demand for metals and minerals, with developing countries increasing their demand at a faster pace. In the case of copper, for example, per capita consumption in developed countries is forecast to register a small growth, while demand in developing countries is projected to double over the next 40 years. But in absolute terms copper use in developing countries will remain small and well below the per capita level in developed countries.

24. The resource consumption trends and projections outlined above demonstrate that many developing countries are growing at a much faster rate than developed countries, but that their consumption levels, on a per capita basis, remain much lower. Demand for energy (in some applications) and for some raw materials (especially metals) in developed countries is slowing down, but their overall consumption levels and many associated wastes and pollutants continue to increase.

25. The implications of this scenario are that industrialized countries must achieve significantly greater progress in delinking resource use and pollution levels from gross domestic product (GDP) growth. Their objective must be to maintain economic development while reducing environmental impacts - doing more with less. The goal of developing countries is to maintain and increase economic growth in order to achieve decent standards of living for their populations and reduce unsustainable pressures on their natural resource base.

26. These differentiated but interlinked goals appear to be pursued best through the strategy of eco-efficiency, which stresses the potential for maximizing environmental development while minimizing throughput of energy and materials. Current patterns of energy, water and material use are often grossly inefficient and unnecessarily costly; many ideas and technologies already exist which could, in principle, achieve dramatic improvements in production and consumption efficiency. In practice, they are proving difficult to implement, owing to well-established economic incentive systems, physical infrastructures and organizational and individual attitudes.

27. In this context, the need for more rapid diffusion of clean technologies in industrialized countries and their transfer to developing countries is an urgent priority.

28. The challenge for policy makers is to develop strategies and instruments that:

(a) Require and encourage resource efficiencies in supply-side processes (production);

(b) Encourage and facilitate alternative demand patterns by consumers;

(c) Facilitate eco-efficient growth in developing countries.

II. ASSESSING THE IMPACT ON DEVELOPING COUNTRIES OF CHANGES IN CONSUMPTION AND PRODUCTION IN DEVELOPED COUNTRIES

29. Agenda 21 calls on industrialized countries to take the lead in changing consumption and production patterns. Many Governments are implementing policies intended to improve energy and materials efficiency and reduce flows of wastes and toxic materials (see sect. III below). Industry has also launched a number of significant initiatives of its own (see sect. IV below). However, the long-term environmental and economic consequences of changes now under way or advocated are unclear. There is particular concern that changes leading to more sustainable patterns of consumption and production in industrialized countries should not adversely affect the development prospects of developing countries and, where possible, should seek to enhance them.

30. The present section (i) summarizes a number of environmental measures developed by government and industry, and wider production/consumption trends, that could have implications for developing countries; and (ii) reviews current work of United Nations and other organizations aimed at improving the understanding of these potential impacts.

31. Measures include ecolabelling schemes, environmental management standards, policy instruments and industry practices stimulated by life cycle analysis and

extended producer responsibility requirements. Most concerns relate to the potential loss of export markets or the creation of new barriers to trade.

A. Ecolabelling

32. Approximately 30 ecolabelling schemes are now operating world wide. The objectives of labelling are to promote products with reduced environmental impacts, to raise consumer awareness and to provide simple information which enables environmentally preferable choices to be made. Developing country schemes are additionally concerned to protect export markets: some ecolabels have been developed to match competition from other labelled products and counter importers' criticisms of exported products' environmental performance. Key concerns over the market penetration of ecolabelled products include the following:

(a) OECD country ecolabel criteria are usually developed to address domestic environmental problems and patterns of production. They are not necessarily appropriate to conditions in exporting countries;

(b) There is a clear trend towards ecolabel schemes adopting a stringent life cycle approach to criteria development, evaluating product performance from the cradle to the grave. This has implications for technologies used in product manufacture and the technologies/practices used during resource extraction or harvesting. Effecting changes in these areas to meet ecolabel criteria would be likely to involve higher costs and logistical problems than changing intrinsic product qualities.

33. The Global Ecolabelling Network was established in March 1994 to develop comparable basic principles and methodologies which may, in turn, lead to converging standards. However, there is no intention to agree on common international criteria; work on comparable principles is at a very early stage.

34. The trade implications of ecolabels have been addressed by the Trade and Environment Committee of the World Trade Organization (WTO) and extensively studied by the United Nations Conference on Trade and Development (UNCTAD). On the evidence so far, it appears that ecolabelling will not necessarily constitute a significant obstacle to developing country exports. If ecolabelled products develop as niche market, quality products carrying a price premium, then they are likely to have relatively little impact on developing country exports, which may still compete on price and other characteristics. If, however, they proliferate and achieve a much wider market share (as has happened for some product categories in the Nordic labelling scheme (see sect. III below)), unlabelled products could be driven out of the market; the implications for exporters are then more serious.

35. However, rising demand for ecolabelled products could also have positive impacts on developing countries in two ways. First, by providing opportunities for expanded exports of environmentally preferable products (actually or potentially) exported by them and secondly, by helping to promote environmentally sounder production practices. These possibilities are currently being explored in UNCTAD and other forums.

B. Environmental management standards

36. Recent developments in this field include the launching of the British Standards Institute's standard BS 7750, the European Union's Environmental Management and Audit Scheme (EMAS) and the ISO 14000 series of standards under development by the International Organization for Standardization. These schemes are voluntary and aim at enhancing companies' environmental performance through improved management practices and standards.

37. ISO 14001, which deals with environmental management systems, is causing concern because it may prove difficult for developing country supplier firms to comply with its requirements. Particular problems relate to:

(a) The difficulty of spreading knowledge and understanding of the standards, particularly relating to their voluntary or mandatory application;

(b) The lack of physical infrastructure necessary for compliance;

(c) The need for international mutual recognition of accreditation bodies and certification schemes.

38. A recent Expert Group Meeting convened by the United Nations Industrial Development Organization (UNIDO) considered the potential effects of the new ISO standards on developing country industrial exports. Its purpose was to define a work programme to undertake technical assistance to enable industries in developing countries to conform to ISO 14000 standards, improve their environmental performance and enhance their competitive position.

39. The ISO 9000 (quality management) standard has been adopted more rapidly by industry than was expected; it remains to be seen whether the ISO 14000 standards will achieve the same popularity. A recent workshop organized by the World Business Council for Sustainable Development (WBCSD) on the role of environment in advertising and marketing concluded that, due to the potential pitfalls of green advertising, promoting the company as an environmentally responsible business provided greater value than advertising the environmental attributes of individual products. Proven corporate environmental performance and conformance with environmental management standards such as EMAS, BS 7750 and ISO 14001 were felt likely to prove more important in purchasing decisions, especially between industrial customers, than ecolabels. This industry attitude, if borne out, indicates that management systems (rather than labelling schemes) will be favoured and adopted by leading companies, with significant domino effects on their suppliers.

C. Life cycle assessment and extended producer responsibility

40. An increasing number of larger enterprises are using life cycle assessment (LCA) methodologies to identify environmental impacts and pollution costs associated with their processes and products. At the same time, Governments are increasingly attracted to policy instruments that impose new responsibilities on producers for managing the environmental impacts of their products - typically at the post-consumer disposal stage (see sect. III below).

41. These related trends are encouraging interest in "loop-closing" industrial processes and consumption cycles (maximized reuse and recycling of materials and waste products), in "light-weighting" or "dematerialization" of products in

order to reduce volumes of waste at the post-consumer stage, and in changing product composition in order to avoid the use of substances hazardous to the environment or human health. Product composition will be an area of critical interest to developing country exporters if their products become increasingly subjected to scrutiny for environmental or health impacts that do not directly affect the citizens of the importing country. For example, Germany has recently proposed banning imports of textiles and clothing using amine-based azo dyes, which are harmful to the health of textile workers. These dyes comprise 75 per cent of the dyes produced and used in India; textiles account for 30 per cent of India's exports.

42. A recent study by UNCTAD cites substance bans, producer take-back obligations, product taxes and charges and information-based instruments, many of which utilize an LCA-based approach, as being the policy measures most likely to affect process and production methods (PPMs) and products of significant export interest in developing countries.

D. Wider economic trends and their implications

1. Materials substitution in industry

43. Materials are constantly substituted in the search for cost reductions and product improvements; this process is influenced also by the need to comply with existing, or anticipate future, environmental legislation and consumer concerns. Such environmentally motivated changes in product composition may be underreported: WBCSD has reported its findings on the low profile accorded by business to many environmental process and product changes. Greening products and processes does not necessarily "sell" with peers or customers.

44. Many examples of materials substitution can be found in the automobile industry, where many car components formerly made of carbon steel are now formed from plastics and other composites. The use of asbestos by European industry is being discouraged: using alternatives "where technically feasible" has been required by European Union legislation for over a decade: in practice, member States have varied in their responses. Bans have been enacted in seven countries for all but a very few applications. In other countries, industry has continued to use asbestos but many companies are voluntarily shifting to alternatives because asbestos is not considered a material of the future and companies wish to be able to export to countries where asbestos is banned. The negative publicity surrounding asbestos has also proved to be a powerful driving force.

45. Limited studies undertaken so far in this area indicate that the implications of such shifts for developing country exporters of primary commodities are far from clear. Technology changes in the steel industry, for example, have encouraged greater use of recycled scrap metal, while pricing competition currently favours the use of iron ore. More positively, UNCTAD is exploring the potential for developing countries to exploit new markets for environmentally preferable materials, such as agricultural fibres as industrial inputs and natural fibres in packaging and as substitutes for glass fibres in reinforced polymer matrix composites.

2. Shift from products to services

46. There is growing evidence in some industry sectors of a move from selling products to supplying customers with services which fulfil the same function. Examples include selling energy management services in place of more electricity - some Californian utilities now expect to generate more profits from demand side management than increased capacity - or providing mobility services instead of vehicles - a new housing development in the Netherlands has been built without garages and the use of private cars is not permitted in the neighbourhood; however, a highly flexible car rental system is in place.

47. The products-to-services trend is most apparent in the information technology sector. On-line directories can replace hard copies; examples include the French Minitel system and CD-ROM telephone directories supplied by telecommunication companies. The music and film industries may be revolutionalized through the supply of on-line films and music in place of videos and compact discs or cassettes.

48. A number of companies are extending their operations to provide hiring or leasing services under which products (typically photocopiers or televisions) are rented, returned for reconditioning and upgrade, then rerented. Xerox has discovered that, by fitting photocopiers with heavier and more durable engines and redesigning a lighter casing, they can lease copiers repeatedly; estimated savings on raw materials are $1 billion over five years.

49. The potential environmental and employment advantages in developed countries of a products-to-services shift are being actively explored in academic and non-governmental circles. Again, the potential impacts on developing countries are unclear. While the demand for some industrial inputs might decline, other opportunities might open up: for example, some privately supplied CD-ROM telephone directories are compiled by data input operators in China.

III. EVALUATING THE EFFECTIVENESS OF POLICY MEASURES INTENDED TO CHANGE CONSUMPTION AND PRODUCTION PATTERNS

50. Section I above identified a number of apparently unsustainable trends in production and consumption patterns and suggested that policy approaches should be based on improving efficiency in production processes and encouraging alternative patterns of demand on the consumption side. The eco-efficiency approach emphasizes the potential for achieving both environmental and economic improvement (the double dividend) and would appear appropriate for both developed and developing countries.

51. The present section analyses and evaluates a number of policy instruments that have been implemented in order to encourage specific changes in the behaviour of producers and consumers. It focuses on instruments intended to improve materials efficiency and waste management in industry; and encourage more environmentally friendly consumer behaviour and product choice.

52. The section contrasts national approaches to meeting policy objectives in those areas, using case-studies drawn from countries with differing geographical, economic and cultural conditions. The objectives of the analysis and evaluation are to draw preliminary conclusions on the effectiveness of different policy instruments operating under different conditions and to

indicate, where possible, some lessons for successful implementation. Evaluation criteria include environmental outcomes, economic efficiency and social (distributional) impacts, though data are often lacking. The emphasis is on policy action taken in OECD countries, since Agenda 21 stresses that it is in the rich countries of the world that change must begin.

53. However, the issues covered in this section are of major concern to industrialized and developing countries alike, though different objectives and priorities will be stressed in different circumstances. For example, waste reduction and avoidance is a priority for countries facing acute shortages of disposal capacity (e.g. Germany, the Netherlands); it is also of importance where uncontrolled waste disposal presents a growing health hazard. Changing consumer behaviour is a priority in high consumption OECD countries but will assume increasing importance in countries experiencing rapid economic growth and the emergence of a new consumer class. Implementation lessons may therefore be of value to all policy makers concerned with environment and development. The conclusions presented in this analysis are based on a wider range of case-studies than can be described in the present report.

A. Materials efficiency and waste management

Extended producer responsibility

54. Extended producer responsibility (EPR) represents one of the most innovative approaches to tackling the problems of rising industrial and household waste volumes (which may be either physically or politically hard to dispose of), rising costs of disposal and human health and environmental concerns relating to the spread of toxic and hazardous substances as a result of dissipative uses of products or inadequate waste management practices. EPR is a relatively new policy strategy that aims at promoting the integration of environmental costs associated with products throughout their life cycle into the market price of the products.

55. Under traditional waste legislation, manufacturers have typically been responsible for the immediate impacts of their activities in terms of emissions, effluents and solid wastes at the materials processing or manufacturing stage. Responsibility for final disposal usually lies with the waste disposal authorities, typically the municipal government. EPR changes these rights and responsibilities and represents a significant extension of the Polluter Pays Principle.

56. The policy approach has emerged, in most cases, as a result of initiatives developed to deal with specific problems, such as packaging waste. It is now beginning to be thought of as a generic approach suitable for influencing the material composition and disposal characteristics of many consumer products.

57. EPR policies have been implemented or are under consideration in nearly 20 OECD countries and a number of non-OECD countries. The two main bases of implementation are regulation or negotiation (voluntary agreements). The simplest EPR approaches seek to influence only the volumes of waste entering the waste stream - for example, differentiated levies on disposed products. Others are more ambitious, involving complex requirements for product recovery (take-back obligations) and reuse and/or recycling targets. Two examples of EPR instruments are presented in boxes 1 and 2.

Box 1. Voluntary agreement: recovery and recycling of scrap vehicles in the Netherlands

Scrap vehicles are 1 of 30 priority waste streams designated for action in the Netherlands: they will be banned from landfills before 2000. Currently, some 75 per cent by weight of car wrecks (the metal content) is already recycled. Less valuable materials - plastics, glass, lubricants etc. - are landfilled. To take care of this fraction and raise the overall recycling rate to 86 per cent by 2000, the Netherlands automobile industry has established a consortium, Auto Recycling Nederland (ARN), to organize a recovery and recycling scheme for non-metal vehicle components. The scheme is funded by a fee of 250 Netherlands guilders ($160) levied on each new car sold after 1 January 1995. An important supplementary measure has been the conversion of the Road Tax to a Vehicle Ownership Tax (from 1 April 1995). Owners of scrapped cars will continue to be liable for tax until their car is officially de-registered; this is intended to discourage illegal dumping.

A legal device is used to avoid the problem of free riders. The Environmental Management Act of 1993 requires the Government, if approached by members of an industry sector who (a) wish to establish a take-back scheme and (b) hold a 75 per cent or greater share of the Netherlands market for their product, to issue an ordinance making the scheme mandatory for all producers or importers in that sector. Beyond this legal arrangement, the Government has minimal involvement with the scheme; the waste fee is levied and administered by ARN, subject only to external auditing.

It is estimated that approximately 90,000 vehicles, over 65 per cent of wrecks reported as dismantled, will be dismantled under the new scheme during its first year of operation. Using existing recycling practices and capacity, about 90 kg of non-metal components per car is currently being processed (75 per cent of target). Given that the non-metal fraction of cars is increasing all the time, ARN will need to find additional techniques and capacity if it is to meet its 2000 target of 218 kg per car. a/

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a/ Netherlands, Ministry of Housing, Spatial Planning and the Environment.

Box 2. Regulation: packaging and products recycling in Austria

The Waste Management Act, 1990, establishes government authority to require producers and distributors to take back wastes and to set targets considered necessary to meet the goals of the national waste management plan. Various ordinances have been enacted, including:

(a) Packaging (October 1993): involves take-back requirements and rising collection targets, peaking at 80 per cent in 1999. Collected packaging must be recycled on a material-specific basis - for example, paper/cardboard, 90 per cent; glass, 93 per cent; plastics, 40 per cent. An amendment of June 1995 sets criteria for energy recovery which most incinerators do not meet;

(b) Batteries and accumulators (October 1993): involves take-back requirements and limitations on heavy metal contents;

(c) Fluorescent lights (1991): involves take-back requirements;

(d) Refrigerators (1993): establishes the right of purchasers of new refrigerators to return their old one with no charge or to return an old one without purchase for a fee.

Other ordinances implemented or in draft form cover electric and electronic goods, expired drugs, waste paper and scrap vehicles. Collection and recycling of packaging waste is handled by the non-profit industry organization Altstoff Recycling Austria (ARA), which collects fees based on type of material. Fees are lowest for those materials easiest to recycle. Available results so far are that over 400,000 tonnes of packaging wastes were collected and recycled in Austria in 1993.

58. EPR requirements implemented to date involve product and transport packaging and a limited range of consumer goods: electrical and electronic goods appear likely to form the next wave of take-back schemes. Policies are still at an early stage of development: environmental benefits are hard to quantify and economic costs, though more quantifiable, are not sufficiently understood to know whether benefits exceed costs. That is, environmental costs have been only partially internalized on the basis of incomplete economic/environmental information. However, the use of EPR may be expected to increase.

59. Raising current levels of materials reuse and recycling will require a clear institutional framework and strong pricing signals to both producers and consumers. Cultural attitudes and behaviour must change from the "out of sight, out of mind" mentality. New infrastructure and recycling businesses must be developed, stimulated by market creation for products from recycled materials.

Implementation lessons

60. The use of quantified targets helps to demonstrate that Governments are serious about achieving change and provides industry with a clear performance measure.

61. Industry participation in drawing up EPR schemes can help to overcome problems associated with loss of competitiveness and free riding. Despite the importance of negotiation, there is anecdotal evidence that industry is reverting to a preference for regulation as the final policy instrument, rather than voluntary agreements.

62. Voluntary agreements appear to work best when there are a limited number of key players and where the level of industry organization is sufficiently sophisticated to liaise with government and organize the establishment of collection/recycling networks. Voluntary agreements usually require back-up in the form of stated government willingness to impose regulations if targets are not met.

63. EPR arrangements need good information collection (to establish the baseline situation) and monitoring systems (to understand and report on progress).

64. Key concerns still relate to (i) ensuring widespread industry participation (no free riders) while (ii) avoiding the creation of monopoly organizations in which industry sectors gain complete control over a potentially valuable (waste) resource. The trade impacts of unilaterally imposed take-back obligations have been the subject of concern within the Single European Market: the wider international implications have not yet been fully explored.

B. Changing behaviour

65. Policy attention in many countries is increasingly being directed towards influencing the purchasing and behavioural decisions of end-users, who include households and individuals, producers (in their role as consumers of raw materials or intermediate products) and Governments, which are often significant actors in their domestic markets. The end-user approach complements more traditional instruments targeted at production sectors: increased understanding of end-user behaviour is a key focus of the OECD ongoing work programme on production and consumption patterns.

66. A wide variety of approaches are currently being used: instruments deployed to date have focused on guiding product choice (through ecolabelling and other product information) and changing behaviour relating to energy saving, waste disposal and personal mobility (through education, information and pricing signals). Other policy concepts of increasing importance to changing consumption and production patterns include demand management and infrastructural provision - that is, the provision of facilities and services that enable and encourage actors to change their behaviour.

1. Ecolabelling schemes*

67. Ecolabels gained widespread favour with policy makers in the mid-1980s as a useful instrument to raise public environmental awareness, guide consumer purchasing choices and thus create an incentive for producers to supply environmentally superior products.

68. Some 30 ecolabel schemes are now operating worldwide, although there is great variation in their market visibility. The oldest established, Germany's Blue Angel scheme, has over 4,000 products labelled in nearly 80 product categories. Taiwan Province of China established its Green Leaf scheme only in 1993 but has already approved nearly 200 products in 26 categories. Many national schemes assess products on a cradle-to-grave basis, taking account of their impacts at all stages of their life cycle, though there is some variation in the exhaustiveness with which this principle is applied.

69. Ecolabels in all schemes tend to be concentrated on relatively few product categories, notably detergents, paper and tissue products, paints and varnishes and a limited number of household cleaning products. This reflects the limited extent of the knowledge base and consensus regarding product criteria.

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* See also sect. II.A above.

Box 3. Ecolabelling schemes

Ecolabelling in the European Union

The European Commission (EC) began work on ecolabelling in 1988, prompted by the need to coordinate environmental quality labels before the advent of the Single European Market in 1992. Plans for the new scheme were unveiled in November 1990 and the EC ecolabel was formally launched in October 1992. However, progress since then has been slower than expected, due partly to methodological problems involved in cradle-to-grave product assessment and partly to lack of industry support for the scheme. Difficulties were also encountered in the initial process of criteria development, under which different member States took sole responsibility for developing criteria for certain products. Judgements have been subject to controversy and challenge by other member States in the scheme's regulatory committee. Criteria have to date been agreed for only seven product categories and labels issued to only one product: washing machines. Consumer awareness of the ecolabel is therefore low and market impact so far is negligible.

The Nordic Swan ecolabelling scheme

The Nordic Swan label is administered by national organizations (including standards institutions and environment ministries) in Sweden, Norway, Iceland and Finland. Initially criteria development was organized at the national level, as with the EC scheme, but progress was delayed by disagreements. Draft product criteria are now drawn up by experts from all four countries drawn from State authorities, environmental organizations, trade, industry and consumer organizations. Their proposals are circulated for comments before final approval by the Nordic Coordinating Body: its decisions must be unanimous. The Nordic Swan label was at first criticized and boycotted by some environmental groups who felt that "concessions" made to industry representatives on the expert panels diluted the label's effectiveness. However, these groups have since rejoined the scheme, recognizing its popularity with the public and market success. By September 1995, criteria had been agreed for 31 product categories and labels awarded to approximately 250 products. Some labelled products, notably detergents, have claimed significant market shares, to the point where non-labelled products are now at a disadvantage. The following figures show the development of the market share for ecolabelled detergents in Sweden:

	Total market share (percentage)
June 1992	12
December 1992	19
June 1993	26
December 1993	52
June 1994	65
December 1994	78
June 1995	80

Source: Swedish Standards Institute.

70. A key question emerging from these examples relates to the "environmental rigour" versus market functioning of ecolabels. If environmental standards are set at a level where relatively many products can be awarded an ecolabel, their visibility will be high and unlabelled products may find themselves squeezed out of the market. If, however, criteria standards are set very high, such that relatively few products can be labelled, these will be viewed as premium quality goods and may never move beyond a niche market position. Experience to date indicates that consumers tend to be more influenced when labelled products are the norm rather than the exception.

Implementation lessons

71. If speed of criteria development and market influence of labelled products are taken as measures of success for an ecolabel scheme, the following factors appear to have been influential in a number of fast growing national schemes:

(a) Involvement of industry and non-governmental organizations in developing criteria helps to ensure that both environmental and commercial interests are met;

(b) Labels appear to thrive in a market structure where small and medium-sized enterprises (SMEs) are dominant in many sectors. SMEs operate in very competitive conditions and are interested in any scheme that may give them a potential market edge: "big companies are rarely the pioneers";

(c) A high level of consumer interest in environmental issues is essential; an active programme of outreach work by ecolabelling bodies can assist in promoting awareness of the ecolabel and the environmental benefits of choosing labelled products.

72. The spurious claims problem - that is, companies promoting their own, unverified, labels - may be dealt with best by industry itself. Peer pressure is claimed by some labelling organizations to be more effective than official action in controlling unfair labels, which are seen as a threat to hard-won genuine labels.

2. Information and education

73. Many advocates of sustainable consumption maintain that significant shifts in production and consumption patterns cannot be achieved without a far-reaching change in public attitudes and aspirations - a reorientation of people's views about material wealth, the environment and quality of life. However, it is recognized that very little is known about the sociological aspects of consumer behaviour: the cultural, ethical and other non-economic factors that contribute to purchasing and behavioural decisions. A recent workshop on education and public awareness for sustainable development concluded that education and public awareness are often a forgotten priority on the political agenda, yet they are essential prerequisites for achieving many other priorities of sustainable development.

74. A number of Governments have attempted to influence environmentally oriented lifestyle decisions through the use of mass media and other information campaigns. However, experience of altering behaviour patterns through changing underlying attitudes (as opposed to suppressing demand by price increases, for

example) tends to be greater in non-environment fields: health education, safety at work, commercial advertising.

Box 4. Information and education

Sensible drinking campaign

The United Kingdom Health Education Authority organizes a series of "Drinkwise" campaigns, using publicity materials to health organizations and the public, press launches and photo opportunities with celebrities and government ministers, activities at the regional and national levels. Each year has a different theme - for example, drinking at home (1992), pubs and restaurants (1993), the workplace (1994). The objectives are to increase public understanding of moderate drinking habits (the concepts of units and safe limits), increase the extent to which people assess their own drinking, promote a positive image of responsible drinking, increase knowledge of the effects of alcohol and links with health and fitness. Research results in 1994 indicated that 90 per cent of respondents recognized the term "alcohol units", with recognition highest among 16-17 year olds and 78 per cent of respondents were aware of unit limits. a/

Fair trade coffee

A number of organizations in Europe promote the sale of coffee produced and marketed by small farmers who receive a fair share of the market price. Intensive information campaigns, notably in the Netherlands and Switzerland, inform consumers of the social and environmental benefits associated with support for small-scale farmers. It has proved very difficult to move beyond a niche market, though consumer awareness is said to be high. The market share in the Netherlands for "Max Havelaar" coffee is 2-3 per cent; in Switzerland, 5 per cent.

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a/ United Kingdom, Health Education Authority, Drinkwise campaign.

Implementation lessons

75. Similar experiences of information-based campaigns aimed at changing Western public attitudes and behaviour suggest a number of principles for action. Information campaigns have tended to be more successful when they:

(a) Emphasize personal benefits; for example, healthy eating campaigns have proved more effective when they emphasize weight loss rather than the reduced risk of coronary heart disease;

(b) Emphasize that change does not imply reduced quality of life;

(c) Build on existing social trends: "low fat" campaigns have been strengthened by consumer interest in general fitness and physical appearance;

(d) Target specific groups in society who have a direct interest in the problem/proposed solution.

3. Pricing signals

76. A wide variety of product and material taxes have been employed in OECD and developing countries to encourage more efficient use (e.g., pesticide taxes in Indonesia, fertilizer taxes in Scandinavia), to discourage/phase out certain substances (e.g., taxes on PVC and CFCs) or to discourage the use of disposable products (e.g., plastic and paper tableware in Denmark, throwaway razors in the Netherlands). Product charges are often levied in conjunction with deposit refund systems to encourage the use and return of multi-trip beverage containers and batteries. High recycling rates have been achieved for materials such as glass and newspaper, especially when reinforced by producer take-back requirements and a well developed infrastructure of return points. However, evidence that product taxes alone have had any real effect on purchasing decisions is patchy. Taxes are rarely levied at a rate high enough to change behaviour; they are more often regarded as a revenue raising measure. An interesting exception to this pattern is developing in the waste management field, where moves from flat rate to volume-based charging can dramatically alter the householder's attitude to waste separation and recycling.

Box 5. Pricing signals

Waste tax of the Republic of Korea

The Government of the Republic of Korea introduced a new system of charging for municipal waste collection in January 1995 as a response to rapidly rising waste volumes. Previously, waste management was financed out of general tax revenues, occasionally supplemented by user fees, levied according to building size or property value. Now, householders can dispose of their waste only in standardized bags, available in sizes from 5 to 50 litres. The cost of waste collection rises from US$ 0.08-0.10 for a 5-litre bag to US$ 0.66-0.93 for a 50-litre bag. Preliminary results (as of August 1995) suggest that domestic waste generation has fallen by an average of nearly 40 per cent. Approximately 16 per cent of the diverted waste is accounted for by increased recycling rates; information is still lacking as to whether the "missing" fraction is being privately disposed of (legally or illegally).

Pricing signals and transport

The potential responsiveness of Governments, vehicle manufacturers and individual drivers to oil prices is well known from the "oil shocks" of the 1970s. In market economies, the average vehicle fuel efficiency rose, lower speed restrictions were imposed and consumers tended to modify both their choice of vehicle and driving behaviour to conserve fuel. Other pricing signals introduced by Governments to influence motorists' purchasing decisions include varying vehicle purchase tax rates - favouring high fuel efficiency and low emissions - and duty differentials between leaded and unleaded gasoline. However, despite many studies indicating the magnitude of environmental and social costs associated with transport and the likely impact on demand which would result from internalization of these costs, the policy response remains very slow. Road pricing has been introduced in a number of countries to raise revenues but is still being studied as a more thorough-

going means of managing demand. The central role of vehicle manufacture/ freight transport and private car use in the economic and social life of most countries currently hinders the incorporation of the Polluter Pays and User Pays Principles into transport policy.

Implementation lessons

77. Substantial work has been carried out on the effectiveness of environmentally oriented economic instruments. Some of the lessons which can be drawn are described below.

78. When set at the correct level, economic instruments can prove effective in modifying the behaviour of producers and consumers. However, the most important reason historically for introducing environmental taxes has been the search for additional revenues. The level of taxes or charges has thus often been too low to have much effect on the undesirable behaviour being taxed. Nevertheless, revenues raised may be sufficient to pay for appropriate environmental management measures. In principle, if the level of tax is sufficient to internalize environmental externalities fully, it should not matter that consumers choose to continue the undesirable behaviour.

79. Economic instruments applied to point sources of pollution (typically emission charges) are most likely to be effective when emission sources are clearly identifiable, effective monitoring mechanisms are in place and the technological potential and economic incentive for reducing emissions exists. A comparative analysis of water effluent charges in a number of European countries indicates that high charges, channelled back to polluters in the form of subsidies for investment in clean technology, have proved the most cost-efficient and effective means of reducing water pollution.

80. Economic instruments applied to non-point sources of environmental damage (typically product charges, deposit refund schemes) tend to work best when existing administrative structures can be used (e.g., value-added tax (VAT) collection), products are manufactured in large numbers and are easily identifiable and consumers have the option of selecting other products (there is high elasticity of demand).

81. Economic instruments are more likely to achieve their environmental objectives when they are politically acceptable. Earmarking of green tax revenues appears to improve their acceptability with the general public.

82. If economic instruments are not equitable in their distributive effects, they should be accompanied by the introduction of compensating measures. More attention needs to be paid to the sectoral and macroeconomic negative effects of new measures and to the effective presentation of charges and their objectives.

IV. PROGRESS MADE IN IMPLEMENTING VOLUNTARY COMMITMENTS TO ACHIEVING SUSTAINABLE DEVELOPMENT GOALS

83. The present section provides a selective update on progress made by national Governments and other major stakeholders in making voluntary commitments to changing consumption and production patterns. It is based on

information made available to the Commission on Sustainable Development by the end of 1995.

84. The Commission, at its third session, urged Governments and other stakeholders to use the report of the Oslo Ministerial Roundtable Conference on Sustainable Production and Consumption as a basis for action. The Oslo report outlined a work programme based on shared responsibility for (a) improving understanding and analysis of problems related to consumption and production; (b) developing and implementing tools for modifying behaviour; and (c) monitoring, evaluating and reviewing performance. This review highlights some achievements in those areas.

A. Industrialized countries

1. Waste minimization and recycling

85. Most OECD countries are continuing the trend towards the introduction of extended producer responsibility instruments and developing product-oriented measures as a distinct area of environmental policy. The Government of Germany continues to build on the life-cycle approach to waste management introduced with the Ordinance on Packaging Waste of 1991, which is estimated to have reduced packaging by 1 million tonnes during the period 1991-1993. The Closed Substance Cycle and Waste Management Act was adopted by Parliament in 1994 and is scheduled to come into force in October 1996. Under its provisions, producer responsibility for the avoidance, reuse, recycling and environmentally sound disposal of wastes will be extended from packaging to a wide range of consumer goods.

86. The Government of Sweden remains committed to the creation of an ecocycle society, in which all producers are responsible for their goods and energy/material efficiencies are maximized. Ordinances setting collection and recycling targets for packaging, waste paper and used tyres have been introduced and similar legislation is in preparation for scrap cars, electronic goods, building materials, textiles and furniture.

87. In Norway, the Ministry of Environment is working on an action plan for sustainable production and consumption, which proposes increased use of economic instruments to internalize environmental costs, extended producer responsibility schemes, use of environmental criteria in public procurement policies and more emphasis on education and consumer information. In mid-1995, the Ministry established the GRIP centre, a Foundation for Sustainable Production and Consumption, which will focus on developing practical management tools that enable enterprises to assess the environmental and economic consequences of alternative investment decisions.

2. Energy efficiency and CO_2 emissions

88. Efforts to curb energy use and reduce CO_2 emissions are proving problematic. Very few OECD countries are on track to meet CO_2 reduction targets agreed under the United Nations Framework Convention on Climate Change, although a number of European countries have stated their commitment to introducing or raising energy/CO_2 taxes (Austria, Germany, the Netherlands and Sweden, for example). Negotiations on a European Union framework for voluntary CO_2 taxes have stalled over the issue of harmonization and resistance from industry. Despite these difficulties, a recent survey of international environmental

policy experts showed that the majority expected carbon/energy taxes to be back on the political agenda by 2000 or earlier.

3. Public procurement

89. The greening of government operations includes measures to reduce the environmental impacts of government buildings, vehicle fleets and purchasing policies. Procurement should be a priority area because of its impacts in the wider economy: according to International Monetary Fund figures, national Governments account for between 9 and 21 per cent of their country's total consumption. A recent survey undertaken on behalf of Environment Canada indicates that 14 of 15 responding OECD Governments have taken some initiatives to green their purchasing policies. However, few involve firm targets or requirements: institutional constraints and lack of political commitment at the highest level remain serious obstacles. Procurement legislation is periodically revised and a number of environment ministries have taken this opportunity to prepare more detailed guidelines on incorporating environmental concerns (e.g., Finland in 1994) or proposing criteria to guide the choice of products and suppliers (e.g., Norway in 1995).

4. Ecological tax reform

90. Many environmental experts suggest that ecological tax reform - shifting the tax burden from labour and capital to pollution and resource consumption - would not only encourage cleaner and more efficient production and consumption but would yield wider benefits in terms of economic growth and new employment opportunities. The idea of a progressive shift in the tax base is beginning to attract interest at the government level, as well as at the non-governmental and academic levels. For example, Norway and Sweden have established Tax-Shift Commissions, working in their Ministries of Finance, to analyse the prospects for and problems associated with further environmental adaptation of the tax system (the Swedish Commission is expected to report in the summer of 1996). The Netherlands has also recently established a working group on greening the tax system and environmental tax reform is expected to become a focus of the Ministry of Environment's policy programme until the year 2000.

B. Central and Eastern European countries

91. Severe environmental degradation in Central and Eastern Europe has been closely linked to inefficient methods of production and wasteful consumption, particularly in the industrial sector. Significant environmental improvements have been registered in some countries since 1989-1990, in some cases 30-40 per cent reductions for some pollutants. These have been brought about largely, but not entirely, by economic restructuring. According to a recent report of the Environmental Action Programme Task Force of OECD, there is evidence that policy measures and investments have been effective in curbing pollution levels in "hot spot" areas. A review of cleaner production programmes implemented in the Central and Eastern European countries confirmed that such programmes had achieved reductions in pollution and waste generation and in energy, water and other raw materials usage of 20 to 40 per cent at no or low cost (i.e., short payback, using own resources).

92. The Task Force stresses, however, that economic and structural change are essential to promote more efficient use of resources, encourage a shift towards less environmentally damaging economic activities and technologies and generate

the resources required by government, enterprises and households to finance environmental expenditures. While many policies and instruments will be required to achieve this, the phase-out of subsidies on energy, water and other raw materials is identified as a fundamental prerequisite for achieving key objectives.

C. Developing countries and newly industrialized countries

93. A number of developing countries, with assistance from donors and international organizations, have launched projects on cleaner production as part of their efforts to save raw materials and energy, reduce production costs and increase competitiveness while reducing environmental risks and damage. In China, for instance, cleaner production has brought about both financial savings to companies and reduced environmental impact. Many benefits were achieved through improved operational procedures and modification of processes without external funding. At the Beijing Brewery, cleaner production techniques reduced beer losses by nearly 20 per cent, yielding annual savings of $200,000 while reducing chemical oxygen demand of waste waters. In Indonesia, a cement company applied cleaner production techniques to improve process control saving $350,000 a year, with the payback period less than one year. Similar progress has been made in other countries, for example, Singapore.

94. In the United Republic of Tanzania, a non-governmental initiative known as Agenda is urging the business sector to address environmental concerns. The initiative seeks to stimulate ecologically sustainable production and consumption patterns and plans to target a wide range of actors and stakeholders, including government officials and grass-roots organizations. Agenda will encourage financial institutions to consider environmental conditions in their transactions with businesses and will support consumer groups in their demands for environmentally friendly products. It will also aid environmental lobby groups and other non-governmental organizations in their efforts to influence development initiatives undertaken by the government and business communities.

95. Many initiatives are under way in Latin America. In Uruguay, a national debate is under way to raise awareness of the importance of changing production and consumption patterns. The media have been involved and education campaigns on recovering and recycling of domestic wastes have been initiated, targeting youth in particular. The Government itself participates in promoting recycling activities. It also cooperates with non-governmental organizations, and has special programmes for young people.

96. In Chile, a number of market-based measures have been implemented to ensure environmental protection and sustainability in resource use. Land ownership is well defined, water rights are defined and tradable, input subsidies in the agriculture sector have largely been abandoned, with input prices based on international competition. But subsidies for plantation forestry and irrigation are maintained. In electricity supply, water and sanitation services, Chile has also adopted market-oriented pricing mechanisms to ensure efficient water and energy use.

97. Cuba has succeeded in saving raw materials and other natural resources through systematic reuse and recycling of materials. For example, 80 per cent of all residues from sugar production are destined for animal feeding and conserving soil fertility. Fresh water is no longer used to irrigate crops.

Instead, waste water from sugar production is now reused in irrigation. Waste oil from automobiles and industry is no longer released into the environment but is being collected and reused. In addition, aluminium, glass, carton and paper are all being recovered and recycled for use as secondary raw materials.

98. In some developing countries, Governments have identified specific sectors for targeted actions. In Indonesia, for example, the Government established in 1994 the Indonesian Ecolabelling Foundation, using timber certification and ecolabelling schemes as instruments for attaining sustainable forestry management. To enhance environmental management standards, some Indonesian companies are also preparing to apply ISO 14000 standards in production.

D. Business and industry

99. The rapid growth in environmental regulation during the late 1980s and early 1990s, together with growing demands from customers, has encouraged business and industry to examine a range of strategies and techniques for moving towards more sustainable production and consumption. There is a clear concern to avoid loss of competitiveness in domestic and international markets but increased government intervention is generally considered to be undesirable. Hence, there is growing emphasis on business putting its own house in order. The concept of total quality environmental management is being voluntarily operationalized in a number of ways:

(a) More industries are adopting environmental principles, guidelines and codes of conduct. This trend is now evident not only in the traditional polluting sectors (such as Responsible Care of the chemical industry) but is extending to the service sector: nearly 50 companies from the insurance industry signed a Statement of Environmental Commitment in November 1995;

(b) Membership of credible organizations promoting sustainable development, such as the International Chamber of Commerce (ICC) is growing. Ten major companies, including Kodak, Monsanto and Proctor and Gamble, joined WBCSD in 1995;

(c) There has been a strongly positive response in industrialized countries to new environmental management systems, of which the most significant are likely to be EMAS and the ISO 14000 series. These schemes are also felt to be revitalizing the requirement to operationalize stewardship responsibility policies, which is a condition of membership of industrial associations such as the European Chemical Industry Council (CEFIC) and ICC;

(d) More companies are introducing community awareness and emergency response programmes.

100. These trends are driven by market pull as well as the perceived need to forestall regulation: factors include pressure for more stewardship responsibility from competitor businesses, industrial customers and government purchasers, as well as from individual consumers.

101. Progress at the product and process level is less widespread. A limited number of companies have begun to think in terms of the sustainable use of their input materials and are using LCA-based quantitative environmental indicators to assess processes or products. For example, Dow Europe (chemicals) has developed an eco-fitness index for products, based on an unweighted sum of scores in five

parameters: energy intensity, material intensity, product durability and functionality, eco-toxicity and resource conservation. Numerous design changes are also visible in packaging, introduced by companies to help meet material recycling/reuse targets in many countries. The use of blister packs, for example, has virtually disappeared in Germany.

102. However, it seems that small and medium-sized enterprises are ill-equipped or unconvinced of the need to adopt more sustainable production patterns. A recent survey in the United Kingdom indicated that many small company directors were sceptical of potential cost savings or market advantages of eco-efficient practices and were unwilling to take action unless forced by government regulation (and prosecution) or strong customer demand.

E. Non-governmental organizations

103. Environmental non-governmental organizations have proved highly active in promoting the concept of sustainable consumption and production to both policy makers and the general public. Key activities include:

(a) Providing information to raise consumer awareness about the environmental and social impacts of their consumption patterns - for example, the Netherlands Committee for the International Union for Conservation of Nature and Natural Resources has produced maps highlighting the effects in other countries of Netherlands agriculture and mining interests;

(b) Providing specific information to guide consumers' purchasing and investment choices: active organizations include the Green Alliance (United Kingdom) and the Council on Economic Priorities (United States);

(c) Promoting the use of ecolabels and other product certification schemes: for example, the Worldwide Fund for Nature is urging European forest owners to have their forest management certified to the principles developed by the Forest Stewardship Council, a partnership between non-governmental organizations, Governments and industry.

104. Friends of the Earth, together with the Wuppertal Institute in Germany, has taken a lead role in developing a strategic approach for achieving sustainable production and consumption patterns through technological and lifestyle change. Their work explores the implications of Western societies attempting to live within their environmental space - that is, the total amount of resource exploitation and pollution that can be sustained globally without impinging on access by future generations to those same resources. In its Action Plan, Friends of the Earth argues that every country has a right to the same amount of environmental space per capita; the implication for industrialized countries would be consumption level reductions of up to 80 per cent. Thirty national Friends of the Earth organizations are now collaborating in a project to develop sustainable visions of their own countries in the year 2010.

F. International organizations

105. OECD is engaged in a two-year work programme on sustainable consumption and production that aims at clarifying the key policy issues, identifying policy options and tools and developing means of monitoring and evaluating progress. The work programme lays particular emphasis on the role of end-users in consumption patterns and seeks to improve understanding of the factors that

influence consumer demand. A recent workshop concluded that the strategy of eco-efficiency, combined with the use of targets, provides an effective approach for policy formulation at all levels.

106. The United Nations Economic Commission for Europe (ECE) and the European Union are cooperating on energy efficiency standards and labels as part of their efforts to reduce emissions of energy-related greenhouse gases and acidifying substances. Under the auspices of their Energy Efficiency 2000 campaign, a two-year project was approved in September 1995 to identify opportunities for developing energy efficiency standards and labels in four countries of Central and Eastern Europe: Belarus, Bulgaria, Hungary and Ukraine. The project aims at investigating the current stock of household appliances, current standards, technical capacity for efficiency improvements and manufacturing capabilities for producing appliances to standards currently applied in the European Union.

107. The Industry and Environment Office of the United Nations Environment Programme (UNEP) has been active in promoting the concept of cleaner production, defined as a preventive strategy to improve the efficiency of processes and products, prevent the pollution of air, water and land, reduce wastes at source and minimize risks to humans and the environment. The Office has documented numerous case-studies worldwide of management and technical changes that have led to reduced environmental impacts and improved economic performance. Together with UNIDO, it has established a number of national cleaner production centres (NCPCs) to help countries build their own institutional capacity to identify cleaner production solutions to their industrial environmental management problems.

108. UNEP is also currently preparing a work programme on sustainable consumption which will involve actively supporting Friends of the Earth in efforts to identify measures to reduce the environmental impacts of consumption in industrialized countries and analysing the potential impacts of change on developing countries.

V. REVISION OF THE UNITED NATIONS GUIDELINES FOR CONSUMER PROTECTION

109. In 1985, the United Nations General Assembly adopted guidelines for consumer protection (Assembly resolution 39/248). The guidelines are an internationally recognized set of minimum objectives for consumer protection, covering such areas as consumer safety, product standards, education and information, labelling and consumer redress. The guidelines have often been cited by Governments as a valuable set of principles for consumer protection and have helped to shape consumer-related legislation in a number of developing countries.

110. The expansion of the guidelines for consumer protection to include guidelines on sustainable consumption was recommended by the Commission at its third session and endorsed by the Economic and Social Council in resolution 1995/53. It is anticipated that guidelines on sustainable consumption patterns will cover schemes for the dissemination of properly researched information and advice on the environmental impact of consumer products, including ecolabelling and eco-profile schemes, the promotion of joint environmental testing, educational programmes on sustainable consumption and standards on environmental claims and advertising.

111. An initial draft of the guidelines is being prepared by the Secretariat in collaboration with Consumers International, a global umbrella organization of consumer organizations. A consultative process will be pursued involving both governmental and non-governmental representatives, in order to review and refine the proposed draft guidelines. It is expected that the guidelines regarding sustainable consumption patterns will be reviewed later by the Commission and recommended for adoption by the General Assembly, through the Economic and Social Council, together with any additional amendments to the original guidelines.

112. Consumer organizations are already playing a significant role in promoting sustainable development and, more specifically, sustainable consumption. They help to educate and inform consumers about the link between their behaviour and environmental impacts, advocate consumers' interests in policy debates, test products for their environmental impacts and publish the results, and conduct research on sustainability issues. Activities by consumer organizations worldwide include:

(a) Participation in ecolabelling expert panels (Scandinavia, India) and development of ecolabelling policy (Indonesia);

(b) Training workshops in the Asia and Pacific region to inform women of the risks of pesticide exposure;

(c) Magazine features in Australia highlighting environmentally friendly products and services and providing advice on behaviour change;

(d) Campaigning to set the parameters for best practices in industry; the Australian Consumers Association and other stakeholders recently developed a Pesticides Charter.

113. One of the consumer rights advocated by Consumers International is that every consumer has the right to a clean environment; at the same time, consumers have the responsibility of preserving and protecting the environment. They can contribute to these aspects of sustainable consumption in two main ways: by choosing greener products which, in turn, provides market feedback to producers; and by changing the way they meet their needs - for example, by using public transport instead of private cars. There is a clear need to revise the United Nations guidelines in order to encourage and facilitate change in both these areas.